

SYSTEM AND LOW-LOSS MILLIMETER-WAVE CAVITY-BACKED  
ANTENNAS WITH DIELECTRIC AND AIR CAVITIES

Abstract of the Disclosure

- 5           A cavity backed millimeter-wave antenna comprises a dielectric cavity within a semiconductor substrate having walls defined by a plurality of vias through the substrate, and a gas cavity external to the substrate aligned with the dielectric cavity. A ground plane side of the substrate may be devoid of ground plane conductive material substantially between the walls of the dielectric cavity.
- 10   In a slot-antenna embodiment, a microstrip feed line may be disposed on the substrate across a slot over the cavities. The slot may be a rectangular region without conductive material on a circuit side of the substrate over the dielectric cavity. In a dipole embodiment, a first pole comprising conductive material may be disposed on a ground plane side of the substrate over the cavities, and a second
- 15   pole comprising conductive material may be disposed on a circuit side of the substrate over the cavities.